Rulison Monitoring Results
Battlement Mesa 36-13D

Well: Gas production well, Battlement Mesa 36-13D, API # 05–045–15468.

Operator: Noble Energy Incorporated

Sampler: U.S. Department of Energy, Office of Legacy Management, Grand Junction, CO.

Date of Sampling Event: 22 January 2009

Samples of natural gas and produced water were collected from production well BM 36-13D.

Location data for the surface collection point and the sample location are given in Table 1. A description of each sample collected is listed in Table 2.

Table 1. Well BM 36-13D, API # 05–045–15468

Sample Point Location	Location	Sample Location						
		Sea Level elevation (feet)	Distance (feet) from		Surface		Distance from GZ (miles)	Heading from GZ (deg)
			N-S Section line	E-W Section line	Latitude (NAD 27)	Longitude (NAD 27)		
Surface	NWSW S36 T7S R95W	8901.0	2,023 FSL	728 FWL	39.392097	-107.952311	0.95	S18.7ºW
Subsurface	NWSW S36 T7S R95W	NA	1,609 FSL	689 FWL	39.390961	-107.952449	1.02	S17.8ºW

Location data updated 29 January 2009.
NA: not available

The subsurface elevation is at the bottom of the well.

Link to Colorado Oil and Gas Conservation Commission information about well BM 36-13D:
http://oil-gas.state.co.us/cogis/FacilityDetail.asp?facid=04515468&type=WELL

Table 2. Sample Description

Sample Ticket No.	Location			Field Sample Matrix	Analytes	Samp Vol. (L)	Comments
	Name	Type	Sub-type				
HCY 499	BM 36-13D	WL	NGAS (ANGL)	Wet gas	3H, 14C	17.8	Sample is collected between the wellhead and separator tank. Wellhead pressure ≈ 220 psi and T ≈ 81.7ºF; sample pressure ≈ 35 psi: at the sample container.
HCY 494	BM 36-13D	TS	TINT	Water	3H, 36Cl, Cl^-	0.5	Collected from a common line connecting BM 36-13D and BM 36-13B.
HCY 494	BM 36-13D	TS	TINT	Water	Gross α/β	1	Collected from a common line connecting BM 36-13D and BM 36-13B.
HCY 494	BM 36-13D	TS	TINT	Water	Gamma Spec	2	Collected from a common line connecting BM 36-13D and BM 36-13B.

WL: well NGAS: natural gas TINT: treatment system internal location psi: pounds per square inch
3H: tritium 14C: carbon 14 36Cl: chlorine 36 Cl^-: chloride
Gross α/β : gross alpha and gross beta analyses Gamma Spec: high-resolution gamma spectroscopy

The water sample was submitted to GEL Laboratories, Charleston, South Carolina, for the analysis by gross alpha, gross beta, high resolution gamma spectroscopy, and analyses of chloride, chlorine 36, and tritium. The results are listed in Table 3.

The natural gas sample was submitted to Isotech Laboratories in Champaign, Illinois, for natural gas analysis and the determination of tritium and carbon-14. The gas analysis results are listed in Table 4.

Table 3. Produced Water Sample HCY-494 Results, GEL Laboratories

RESULTS REPORT
RIN: 09012065
Site: Rulison Site
Location: BM 36-13D
Ticket Number: HCV 494
Report Date: 3/11/2009

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Standard[1]
H-3	pCi/L	01/22/2009	N001	-32.8	U			20,000
Actinium-228	pCi/L	01/22/2009	N001	13.6		J		
Americium-241	pCi/L	01/22/2009	N001	5.81	U			
Antimony-125	pCi/L	01/22/2009	N001	-1.71	U			
Cerium-144	pCi/L	01/22/2009	N001	-3.04	U			
Cesium-134	pCi/L	01/22/2009	N001	0.408	U			
Cesium-137	pCi/L	01/22/2009	N001	-0.508	U			
Cobalt-60	pCi/L	01/22/2009	N001	-0.228	U			
Europium-152	pCi/L	01/22/2009	N001	-0.478	U			
Europium-154	pCi/L	01/22/2009	N001	-0.769	U			
Europium-155	pCi/L	01/22/2009	N001	3.43	U			
Lead-212	pCi/L	01/22/2009	N001	3.45	U			
Potassium-40	pCi/L	01/22/2009	N001	422				
Promethium-144	pCi/L	01/22/2009	N001	0.968	U			
Promethium-146	pCi/L	01/22/2009	N001	-0.273	U			
Ruthenium-106	pCi/L	01/22/2009	N001	11.4	U			
Thorium-234	pCi/L	01/22/2009	N001	14.5	U			
Uranium-235	pCi/L	01/22/2009	N001	3.67	U			
Uranium-238	pCi/L	01/22/2009	N001	14.5	U			
Yttrium-88	pCi/L	01/22/2009	N001	0.686	U			
GROSS ALPHA	pCi/L	01/22/2009	N001	9.28	U			
GROSS BETA	pCi/L	01/22/2009	N001	216				
Chloride-36	pCi/L	01/22/2009	N001	8.59	U	J		
CHLORIDE	mg/L	01/22/2009	N001	18500		J		

[1] USEPA Primary Radionuclide Drinking Water Standard.

Table 4. Natural Gas Sample HCY-499 Results, Isotech Laboratories

RESULTS REPORT
RIN: 09012066
Site: Rulison Site
Location: BM 36-13D
Ticket Number: HCY 499
Report Date: 3/11/2009

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Standard[2]
Helium	percent	01/22/2009	N001	0.0026				
Hydrogen	percent	01/22/2009	N001	0.0034				
Argon	percent	01/22/2009	N001	nd[1]				
Oxygen	percent	01/22/2009	N001	0.0054				
Nitrogen	percent	01/22/2009	N001	0.038				
Carbon Dioxide	percent	01/22/2009	N001	5.51				
Methane	percent	01/22/2009	N001	86.41				
Ethane	percent	01/22/2009	N001	5.68				
Propane	percent	01/22/2009	N001	1.36				
Isobutane	percent	01/22/2009	N001	0.302				
Butane	percent	01/22/2009	N001	0.273				
Isopentane	percent	01/22/2009	N001	0.115				
Pentane	percent	01/22/2009	N001	0.0855				
Hexanes	percent	01/22/2009	N001	0.216				
Carbon-14	Percent modern carbon	01/22/2009	N001	0.2	U			
Tritium	pCi/L methane	01/22/2009	N001	0.0591	U			

[1] Not detected.
[2] There are no applicable standards for natural gas.

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:
U Analytical result below detection limit.

DATA QUALIFIERS:
F Low flow sampling method used.
G Possible grout contamination, pH > 9.
J Estimated value.
L Less than 3 bore volumes purged prior to sampling.
Q Qualitative result due to sampling technique.
R Unusable result.
U Parameter analyzed for but was not detected.
X Location is undefined.

QA QUALIFIER:
Validated at Level 1 according to quality assurance guidelines.